

Calculus I Test

Name _____

Find the derivative of the following.

_____ 1. $y = \frac{\cot 8x}{4}$

_____ 2. $y = \left(x^2 + \frac{2}{x}\right)^4$

_____ 3. $y = x\sqrt{x^2 - 1}$

_____ 4. $y = x \sec x - \cos 3x$

_____ 5. $y = \frac{x}{\sqrt[3]{x^2 + 4}}$

_____ 6. $x^2 - 4x^2y^3 = 4$

_____ 7. $(x^2 - 2x + 1)(x^4 + 2)$

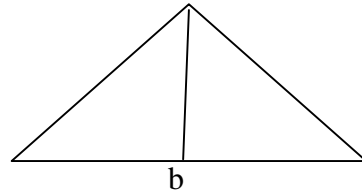
_____ 8. $y = \tan^3\left(\frac{1}{x}\right)$

_____ 9. $y = \frac{x^3 - 4x^2 + 6}{x^2}$

_____ 10. $x \sin(4y) = 6$

_____ 11. Find the tangent line for the curve $y = (x^3 + 2)^3$ at the point (1,27)

12. The base b of the triangle is growing at the rate of 2 meters per hour, and the altitude h is decreasing at the rate of $1/2$ meter per hour. At one instant, the base and the altitude are both 5 meters. How is the area changing at that instant?



13. Apply the definition of the derivative to find $f'(x)$. The derivative of the function f is the function $f'(x)$ defined by $f'(x) = \lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h}$ if $f(x) = 3 - 2x^2$

14. A car is traveling at 100 ft/s when the driver suddenly applies the brakes ($x=0, t=0$). The position function of the skidding car is $x(t) = 100t - 5t^2$. What is the velocity of the car after 1 second? What is the acceleration of the car after 1 second?

_____ velocity

_____ acceleration

_____ 16. Which of the following graphs would not be differentiable everywhere? $y = |x + 3|$, $y = x^2 + 4$, $y = \frac{x}{x^2 + 4}$